

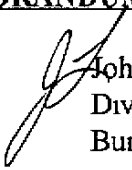


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MEMORANDUM

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SUBJ Evaluation of **Phibro-Tech's** status under the RCRIS Corrective Action Environmental
Indicator Event Codes (CA725 and CA750)
EPA ID Number SCD 070 371 885

DATE July 22, 1998

I. PURPOSE OF MEMO

This memorandum is written to formalize an evaluation of Phibro-Tech's status relative to the following corrective action event codes defined in the Resource Conservation and Recovery Information System (RCRIS)

- 1) Human Exposures Controlled Determination (CA725),
- 2) Groundwater Releases Controlled Determination (CA750)

These event codes are applicable according to the definitions and guidance provided by the Office of Solid Waste (OSW) in the July 29, 1994, memorandum to the Regional Waste Management Division Directors, and clarification provided by USEPA Region IV in October 1997

The State of South Carolina became authorized, in January 1995, for implementing those portions of RCRA covered under the HSWA Corrective Action process. The recommendations provided in this document have been generated in cooperation with the USEPA Region IV staff through the use of EPA's current Environmental Indicator ranking system

II. HUMAN EXPOSURES CONTROLLED DETERMINATION (CA725)

There are five (5) national status codes under CA725. These status codes are

- 1) YE Yes, applicable as of this date
- 2) NA Previous determination no longer applicable as of this date
- 3) NC No control measures necessary
- 4) IN More information needed
- 5) NO Facility does not meet definition

Note that CA725 is designed to assess the potential for human exposures over the entire facility (i.e., the code does not evaluate specific actions undertaken at individual SWMUs). Therefore, every area at the facility must meet the definition before a YE, or NC, status code can be entered for CA725. The NO status code should be entered if there are current unacceptable risks to human health due to releases of hazardous wastes or hazardous constituents from any SWMU(s) or AOC(s). The IN status code is designed to cover those cases where insufficient information is available to make an informed decision on whether or not human exposures are controlled. If an evaluation determines that there are both unacceptable and uncontrolled current risks to human health at the facility (NO) along with insufficient information on contamination or exposures at the facility (IN), then the priority for the EI recommendation is the NO status code.

According to recent guidance from USEPA Region IV, the previous relevance of NA as a meaningful status code was eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN to the existing YE and NC status codes. In other words, YE, NC, NO, and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA725. Therefore, the NA status code will no longer be used for facilities located in Region IV.

This particular CA725 evaluation is the first evaluation performed by DHEC for Phibro-Tech, Inc. Because assumptions have to be made as to whether or not human exposures to current media contamination are plausible and, if plausible, whether or not controls are in place to address these plausible exposures, this memo first examines each environmental medium (i.e., soil, groundwater, surface water, air) at the entire facility including any offsite contamination emanating from the facility rather than from individual areas or releases. After this independent media by media examination is presented, a final recommendation is offered as to the proper CA725 status code for Phibro-Tech.

The following discussions, interpretations and conclusions on contamination and exposures at the facility are based on the following reference document: RCRA Facility Investigation Work Plan revised February 1995, RCRA Facility Investigation, Phase I Interim Report, dated June 11, 1997, First Quarter 1998 RCRA Report of Groundwater Quality dated April 30, 1998.

III. FACILITY SUMMARY

Phibro-Tech, Inc. manufactures inorganic chemicals from raw materials and spent etchants.

received from offsite facilities. As of August 1995, the production of copper based salts made up approximately 94% of the facility's total production and 100% of the hazardous waste recycling activities on site. Other products include nickel and cobalt salts and oxides, patented and proprietary alkaline etchants, metal sulfates (such as copper and nickel sulfate) and metal nitrates. Phibro-Tech, Inc. was issued a RCRA Hazardous Waste Permit in December 1993 for the storage of hazardous wastes in containers and tanks, and for post closure care of three former surface impoundments.

Prior to February 1986, process wastewaters were treated in three surface impoundments located in the northeastern corner of the property. Sludge from all three impoundments failed toxicity testing for cadmium and, consequently, were closed pursuant to RCRA. Currently, process wastewater is pretreated on site in an above ground treatment system, then discharged to the local publically owned treatment works. The following solid waste management units and areas of concern, which have been investigated pursuant to Phibro-Tech's HSWA commitments, are also located in this general area of the site: the Ferrous Sulfate Burial Area (SWMU 29), The Old Lagoon Sludge Burial Site (SWMU 15), and the Former Burial Area "B" (SWMU 34). The remainder of the solid waste management units/areas of concern investigated are located in, or in close proximity to, the process area of the site.

Prior to 1976, Exide Battery owned and operated the facility and from 1966 to 1973 produced nickel flake, nickel sulphamate, and nickel sulphate. After the discovery in 1973 of a groundwater contaminant plume underlying the process area of the site, characterized by elevated concentrations of cadmium and nickel, Exide Battery modified plant operations to produce zinc chloride solutions and sodium hydroxide.

IV. MEDIA BY MEDIA DISCUSSION OF CONTAMINATION AND THE STATUS OF PLAUSIBLE HUMAN EXPOSURES

Contaminated Soils within the Process Area

Soil borings were advanced in the process area of the site during Phibro-Tech, Inc.'s Phase I RCRA Facility Investigation (RFI). Soil borings were generally advanced to a depth of approximately ten (10) feet below grade and samples were typically collected from each two (2) foot interval. Samples were generally analyzed for chlorides, sulfates, metals (cadmium, cobalt, copper, chromium, iron, lead, nickel, and zinc). Soil samples were also screened (i.e. headspace vapors) for organics. Only cadmium (at four, eight and ten feet below grade) was detected above its Region III EPA Industrial Risk Based Concentration at SWMU 2, the former Meaker and Nickel Hydrate Area. However, nickel and copper were detected in soils from four feet below grade at concentrations above their Region III EPA Residential Risk Based Concentrations at this particular unit. It is important to note that only one boring was advanced at this unit during the Phase I RFI.

Copper in surface or near surface (0.5 foot below grade) soils was detected above its Region III Residential Risk Based Concentration at the Drum Unloading Dock (SWMU 16), the Railroad Unloading Area (SWMU 19), and the Outdoor Waste Pile Area (SWMU 23). The presence of elevated concentrations of copper in process area soils is not unexpected, given Phibro-Tech's primary production of copper based salts. Cadmium was also detected in near surface soils at the Drum Unloading Dock (SWMU 16) at a concentration above its Region III EPA Residential Risk Based Concentration.

Hazardous Waste Permit SCD 070 371 885 allows storage of basic metallic solution within a 12,690 gallon storage tank (the Spent Ammonium Cupric Chloride Storage Tank/SWMU 20) and storage of acid metallic solution or "spent etchant" within a 25,379 gallon storage tank (the Spent Acid Cupric Chloride Storage Tank/SWMU 21). Copper was detected within surficial soils sampled immediately below the concrete pad at SWMU 21, at a concentration above its Region III EPA Residential Risk Based Concentration. Nickel was detected within soils 0.5 feet below the concrete pad at SWMU 20 at a concentration above its Region III Residential Risk Based Concentration.

Solid Waste Management Unit 35 is the only unit located in or near the process area of the site that is unpaved. It consists of a sludge burial area where zinc carbonate sludge generated at the wastewater treatment plant was buried. Two samples of the zinc carbonate sludge were collected during Phibro-Tech's RFI. One sludge sample leached concentrations of cadmium in excess of the Toxicity Characteristic Leaching Procedure (TCLP) regulatory level. Both sludge samples leached concentrations of lead in excess of the TCLP regulatory level. One soil boring was advanced below the sludge and continued to the water table (15 to 35 feet) in order to assess the extent of leachate infiltration. Soil samples were collected every two feet and analyzed for total metals. No metals were detected within underlying soils at concentrations exceeding Region III EPA Industrial Risk Based Concentrations.

Groundwater Contamination Underlying Process Area

A groundwater contaminant plume was discovered by the site's original owner (Exide Battery) underlying the main process area of the site. The groundwater contaminant plume is characterized by excessive concentrations of nickel, as well as cadmium, zinc, and copper. The primary source of this contaminant plume was identified in a 1974 Wilbur Smith and Associates Report to be drainage troughs (SWMU 2) within the Meaker and Nickel Hydrate Areas of the former Exide Battery Chemical Plant (i.e., now the main Phibro-Tech, Inc. Manufacturing Building).

In 1974 Exide Battery installed one recovery well (the salvage well) in the main manufacturing area of the site. Available data indicate that the concentration of cadmium in groundwater extracted from the well is approximately 6000 times the Safe Drinking Water Maximum Contaminant Level (MCL) of 0.005 milligrams per liter and nickel concentrations are approximately 1500 times its MCL of 0.1 milligrams per liter. According to Phibro-Tech, Inc., the purchase agreement between Exide and Phibro-Tech stipulated that the extraction well be pumped at Exide's expense for six years following the 1976 sale of the property. Although Phibro-Tech has, since 1982, continued to pump the salvage well, the concentration of metals in groundwater recovered from the well creates problems for the facility in meeting their pretreatment limits for discharge to the publically owned treatment works. The effectiveness of the single recovery well in capturing the metals plume underlying the process area of the site is unknown. Although the recovery well has been identified as an interim corrective measure, Phibro-Tech has not been under any obligation to report the operational status or volume of water pumped from the well. Furthermore, little is currently known about the well's construction.

In order to assess the extent of the groundwater contaminant plume during Phibro-Tech, Inc.'s RCRA Facility Investigation (RFI), groundwater was sampled from geoprobe borings installed within the process area of the site. The highest concentrations of dissolved metals detected in groundwater were not detected within the vicinity of the former Meaker and Nickel Hydrate Areas (SWMU 2), as expected. The highest concentrations of metals dissolved in groundwater were

detected at Phibro-Tech's downgradient property boundary, adjacent to the railroad tracks. Phibro-Tech, Inc. argues that the recent geoprobe data supports an offsite source for the metals contaminant plume (i.e. spillage along the railroad spur) and has proposed a second phase of groundwater assessment to support their argument. Although an offsite source for metals contamination of groundwater is possible, it is more likely that the geoprobe data merely reflects migration of the groundwater contaminant plume from the source area (SWMU 2). In all probability, extensive paving in the process area has merely decreased the concentrations of metals currently leached from soils.

In 1990 through 1994, Phibro-Tech Inc. installed groundwater monitoring wells along their southeastern property boundary (i.e. adjacent to Yuasa, Inc.) in an attempt to identify an offsite, and upgradient source for the metals contaminant plume. Minor concentrations of metals were detected in the monitoring wells installed at the property boundary. However, volatile organic constituents, primarily trichloroethene, were detected within groundwater migrating onto Phibro-Tech Inc.'s property from the neighboring Yuasa, Inc. facility. Recent assessment activities at Yuasa, Inc. have confirmed the presence of a former solvent pit that is sourcing the volatile organic constituents detected downgradient at Phibro-Tech, Inc.

Contaminated Soils and Burial Areas within the Vicinity of the Former Surface Impoundments

Old Lagoon Burial Site/Burial Area "C" (SWMU 15)

During the early 1970's, Exide Battery dredged Surface Impoundments 1 and 2 for the purpose of recovering nickel from the sludges. Sludges which contained unrecoverable nickel were placed in a site adjacent to the wastewater lagoons. Prior to 1991, Phibro-Tech, Inc. was unsure of the exact location that nickel sludge was buried. However, during construction activities associated with closure of the three surface impoundments, sludge was discovered west of former Lagoon #2. Upon discovery, the sludge was characterized and its volume assessed. It contained nickel (69 mg/kg), barium (42 mg/kg), copper (77 mg/kg), chromium (58 mg/kg), lead (56 mg/kg), cobalt (15 mg/kg), arsenic (11 mg/kg), and mercury (11 mg/kg). Most of the nickel sludge encountered on December 1991 was removed by excavation of the perimeter drainage ditch around the cap of the three former impoundments. Any remaining sludge was encapsulated during closure of the impoundments. One boring was installed to a depth of ten (10) feet adjacent to the perimeter drainage ditch during the RFI and no non-native materials were encountered.

Ferrous Sulfate Burial Area/Burial Area "A" (SWMU 29)

In January 1989, in an attempt to delineate a second location where Exide Battery buried ferrous sulfate, Phibro-Tech, Inc. completed a detailed magnetometer survey approximately 300 feet west of former Surface Impoundment 3. Three anomalies were detected and collectively, these anomalies are referred to as the Ferrous Sulfate Burial Area (SWMU 29). Waste and soil samples were collected from SWMU 29 during August 1989. Field descriptions indicate that the trenches held metal and plastic drums containing yellow powder, organic fluid, silver flakes, batteries, paint, asphalt, and other construction debris. A bright green crumbly material thought to be inorganic nickel (possibly lagoon sludge) was also found. Only a limited suite of analyses were completed in 1989 on waste samples and underlying sediments from SWMU 29. Waste samples were analyzed for inorganic constituents, whereas underlying soils were analyzed for volatile organic constituents. Nickel, detected in a sample of the bright green crumbly material, was the only constituent detected.

at a concentration above Region III EPA's Industrial Risk Based Concentration

Although the concentration of chlorinated organic contaminants detected within soils underlying the wastes did not exceed Region III EPA's Industrial Risk Based Concentrations during the limited sampling and analyses effort completed in 1989, the concentrations of chlorinated solvents leaching from wastes placed within this unit are sufficient to cause exceedences of Safe Drinking Water Act Maximum Contaminant Levels (MCLs) at Phibro-Tech, Inc.'s property boundary, downgradient from SWMU 29. For example, the concentration of trichloroethene (MCL equal to 0.005 milligrams per liter) that was detected in groundwater in 1987 from monitoring well MW-6, which is located downgradient of SWMU 29 at the property boundary, was 1.6 milligrams per liter. Currently the concentration of trichloroethene detected in groundwater from MW-6 is approximately 0.035 milligrams per liter.

An interim corrective measure was proposed and approved for the Ferrous Sulfate Burial Area (SWMU 29) within Phibro-Tech's approved RFI Workplan dated February 20, 1995. The interim corrective measure entailed the removal of wastes and contaminated soils, to the extent feasible, from SWMU 29. Additional groundwater monitoring wells, immediately downgradient of SWMU 29, were to be installed later (i.e. during the RFI) in order to delineate the impact to groundwater from this unit, as opposed to groundwater degradation resulting from wastewater treatment activities within the former surface impoundments. The proposed interim corrective measure has not been implemented at the Ferrous Sulfate Burial Area (SWMU 29). Furthermore, additional assessment of groundwater quality downgradient of SWMU 29 has not been completed.

Burial Area B (SWMU 34)

This unit was discovered in 1988 during a magnetometer survey of the surface impoundment area. Burial Area B (SWMU 34) was located within the eastern berm of Surface Impoundment 1. Approximately 1400 cubic yards of waste and contaminated soils were excavated from Burial Area B (SWMU 34) in July 1992 prior to closure of the surface impoundments and placement of the clay cap. Excavated wastes consisted of drums of ferrous sulfate baghouse dust, hard tar of an asphalt base with toluene and/or xylene, graphite mixed with kerosene, hardened paint, cellulosic filter cake with iron and/or nickel, lumber, tar paper, and well water filter cartridges. Composite samples of soils collected at the bottom of the excavations were analyzed for toxicity. None of these samples failed the toxicity characteristic leaching procedure for metals or volatile organic constituents. Burial Area B is now encapsulated within the clay cap constructed over the former surface impoundments.

Groundwater Contamination Underlying the Former Surface Impoundments

A separate and distinct groundwater contaminant plume is present in the northeastern area of the site, underlying the former surface impoundments that were used to manage process wastewater. This groundwater contaminant plume is also characterized by the presence of metals (arsenic, cadmium, chromium and zinc). The concentrations of metals dissolved in groundwater in this area of the site are much less than those characterizing the groundwater contaminant plume underlying the process area of the site. Solvents, primarily sourced by the Ferrous Sulfate Burial Area (SWMU 29) are also present and commingle with the metals contaminant plume underlying the former surface impoundments. Phibro-Tech, Inc. routinely monitors and reports groundwater quality for the surface impoundment area pursuant to the South Carolina Hazardous Waste Management Regulations (R 61-79.264.99) and their post-closure care permit.

Surface Water

Once the groundwater contaminant plume underlying the process area was discovered, surface water from Nasty Branch Creek was sampled. Nasty Branch Creek is approximately 2400 feet downgradient of Phibro-Tech, Inc. Surface water was sampled at the dam of the Cain Mill Club from 1974 through 1981, on a routine basis. Nickel was rarely detected in these surface water samples at concentrations above the method detection limit of 0.1 milligrams per liter. Neither was nickel detected at concentrations above the method detection limit in groundwater samples from the cemetery or the Cain Mill Club wells which are located between Phibro-Tech, Inc. and the surface water discharge. Nasty Branch Creek does not appear to have been impacted in the 1974 through 1981 timeframe.

Both the modification of production operations (such as the transition to zinc chloride solutions and sodium hydroxide and later to copper based salts), and the extensive paving and upgrades to secondary containment systems in the process area, appear to have effectively decreased the concentration of nickel and cadmium currently leaching from contaminated soils. Given the distance between the suspected source area and Nasty Branch Creek and the operation of a salvage well at the suspected source area, current impact to surface water via the discharge of contaminated groundwater is thought to be unlikely.

Air

The odor of ammonia emanating from the process area of the site has been a nuisance in the past. Phibro-Tech, Inc. has modified their production processes to eliminate the odor. Air emissions from the facility are not currently regulated and are not expected to pose a risk to human health or the environment.

V. STATUS CODE RECOMMENDATION FOR CA725:

The Phibro-Tech, Inc. facility is fenced and security is maintained at the plant entrance. The company has made many capital improvements in the process area of the site. Most of the solid waste management areas and/or areas of concern located in this area of the site have been paved and bermed. The risk to employees from exposure to contaminated soils underlying the solid waste management units and/or areas of concern located in the processing area of the site is thought to be minimal. Sludges and wastes were removed from the Old Lagoon Burial Site (SWMU 15) and Burial Area B (SWMU 34) prior to, or during, closure activities associated with the former surface impoundments. These two units are sealed beneath the clay cap that has been constructed over the surface impoundments to prevent the infiltration of rainwater. The risk to employees from exposure to contaminated soils remaining in these units is thought to be minimal. Sludge remains in the subsurface at the zinc carbonate sludge burial area (SWMU 35). This unit is unpaved and is located in a storage area or "boneyard" adjacent to the process area. The boneyard is isolated from day to day operations and sludge was placed approximately twelve (12) feet below grade, in trenches, and the trenches were capped with clay. Given its isolated location and the depth of sludge burial, the risk to employees from exposure to sludge and contaminated soils at SWMU 35 is thought to be minimal.

Wastes also remain at the Ferrous Sulfate Burial Area (SWMU 29). This unit is located approximately three hundred (300) feet west of the former surface impoundments in an area of the site that is infrequently visited. The unit is unpaved and during the exploratory trenching conducted in 1989, wastes were encountered near the surface (i.e. a foot and a half below grade). Given the

absence of institutional controls to prevent the potential for exposure of employees to wastes and contaminated soils remaining near grade at SWMU 29, plausible human exposure from wastes remaining at this unit are uncontrolled at this time. Therefore, a status code of CA725 NO is recommended for Phibro-Tech, Inc.

VI. GROUNDWATER RELEASES CONTROLLED DETERMINATION (CA750)

There are five (5) status codes listed under CA750

- 1) YE Yes, applicable as of this date
- 2) NA Previous determination no longer applicable as of this date
- 3) NR No releases to groundwater
- 4) NO Facility does not meet definition
- 5) IN More information needed

The first three (3) status codes listed above were defined in January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in June 1997 Data Element Dictionary.

The status codes for CA 750 are designed to measure the adequacy of actively (e.g., pump and treat) or passively (e.g., natural attenuation) controlling the physical movement of groundwater contaminated with hazardous constituents above relevant action levels. The designated boundary (e.g., the facility boundary, a line upgradient of receptors, the leading edge of the plume as defined by levels above action levels or cleanup standards, etc.) is the point where the success or failure of controlling the migration of hazardous constituents is measured for active control systems. Therefore, every contaminated area at the facility must be evaluated and found to have the migration of contaminated groundwater controlled before a "YE" status code can be entered.

If contaminated groundwater is not controlled in any area(s) of the facility, the NO status code should be entered. If there is not enough information at certain areas to make an informed decision as to whether groundwater releases are controlled, then the IN status code should be entered. If an evaluation determines that there are both uncontrolled groundwater releases for certain units/areas (NO) and insufficient information at certain units/areas of groundwater contamination (IN), then the priority for the EI recommendation should be the NO status code.

According to recent guidance from USEPA Region IV, the previous relevance of NA as a meaningful status code was eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN to the existing YE and NC status codes. In other words, YE, NC, NO, and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA725. Therefore, the NA status code will no longer be used for facilities within Region IV.

This evaluation for CA750 is the first formal evaluation performed for Phibro-Tech, Inc.

Please note that CA750 is based on the adequate control of all contaminated groundwater at the facility. The following discussions, interpretations and conclusions on contaminated groundwater at the facility are based on the following reference documents: RCRA Facility Investigation Work Plan revised February 1995, RCRA Facility Investigation, Phase I Interim Report, dated June 11, 1997, First Quarter 1998 RCRA Report of Groundwater Quality dated April 30, 1998.

VII. STATUS CODE RECOMMENDATION FOR CA750:

The groundwater contaminant plume emanating from the process area of the site was discovered in 1973 when two public supply wells located downgradient of Phibro-Tech, Inc. (i.e. Exide Battery at that time) at the W C Jones Trailer Park were discovered to be impacted. The wells were condemned, Exide Battery bought the property, drilled a deeper domestic well, and rented the existing residence to an employee. Eventually, municipal water was provided to this residence. In 1991 Phibro-Tech, Inc. purchased the former W C Jones property from Exide Battery. The two shallow water supply wells and the deeper domestic well located at the former W C Jones Trailer Park were sampled by the Department on a routine basis from 1973 through 1981. A well located further downgradient at the Hillside Memorial Cemetery, a well at the Cane Mill Club, and five private residences (Geddings, Leach, W T Russell, F W Russell, and Dr. Phifer) were also sampled on a routine basis during this timeframe. Based on the historical data, groundwater impact appeared to be restricted to the water table aquifer and the leading edge of the groundwater contaminant plume appeared to be restricted to the adjacent W C Jones Trailer Park property.

Groundwater contaminated at concentrations in excess of Safe Drinking Water Act Maximum Contaminant Levels continues to migrate from the process area of the site. The effectiveness of the single recovery well installed to control plume migration in 1974 is unknown. Contaminated groundwater emanating from the Ferrous Sulfate Burial Area is presently migrating offsite in the area of the former surface impoundments. Because groundwater releases at Phibro-Tech, Inc. are presently uncontrolled, a status code of CA 750 NO is recommended for this site.

VIII. SUMMARY OF FOLLOW-UP ACTIONS:

Phibro-Tech, Inc. has committed to implement the interim corrective measure approved for the Ferrous Sulfate Burial Area (SWMU 29) in August 1998. Further groundwater assessment in the process area of the site has been proposed in the facility's Phase II RFI Workplan. In approving the Phase II RFI Workplan the Department will require the scope of the groundwater assessment be expanded downgradient to include the former W C Jones property and offsite, as needed to delineate the horizontal extent of contamination. Once the source of the metals contaminant plume is better understood, and the magnitude and extent of groundwater contamination is delineated, the present recovery system will be upgraded. Phibro-Tech will be asked to begin reporting the operational status of the one recovery well installed in the process area of the site, and volume pumped from this well, on a routine basis.

cc Channing Bennett, Region IV EPA
Caron Falconer, Region IV EPA
Capers Dixon, Wateree District